REMARKS

The present patent application now comprises fifty-one (51) claims, numbered 1-15 and 17-52.

Claims 4, 5, 10-14, 23-27, 35 and 36 have been previously withdrawn. Claim 16 was previously cancelled.

Claims 1, 22 and 32 have been amended. New claims 38-52 have been added.

Support for amendments made can be found throughout the specification and drawings as originally filed. No new matter has been added to the present patent application by way of the present response.

1. Rejection of Claims 1-3, 15-19, 22, 28-31 [*sic*], 28-34 and 37 under 35 USC 102

On pages 2-4 of the Final Office Action, the Examiner rejected claims 1-3, 15-19, 22, 28-31 [*sic*], 28-34 and 37 under 35 USC 102(b) as being anticipated by U.S. Patent 6,407,855 to MacCormack *et al.* (hereinafter referred to as "MacCormack").

As discussed below, the Applicants respectfully submit that claims 1-3, 15, 17-19, 22, 28-34 and 37, as amended, are in condition for allowance and respectfully requests the Examiner to withdraw her rejection of these claims.

Independent claims 1, 22 and 32

Claims 1, 22 and 32 are reproduced below with elements being emphasized:

1. A multi-wavelength laser source comprising:
   a) an input for receiving an energy signal;
   b) a gain section in communication with said input, said gain section including a gain medium having a superstructure grating, **said superstructure grating forming a plurality of cavities that are distributed in said gain medium such that different resonant**

wavelengths resonate in spatially separated portions of said gain medium when the energy signal is applied to said gain section, said gain section generating a multi-wavelength laser signal when the energy signal is applied to the gain section; and

c) an output for emitting the multi-wavelength laser signal.

22. A method suitable for generating a multi-wavelength laser signal, said method comprising:
    a) receiving an energy signal;
    b) providing a gain section including a gain medium having a superstructure grating, **said superstructure grating forming a plurality of cavities that are distributed in said gain medium such that different resonant wavelengths resonate in spatially separated portions of said gain medium** when the energy signal is applied to said gain section; and
    c) applying the energy signal to said gain section to generate a multi-wavelength laser signal.

32. A multi-wavelength laser source comprising:
    a) a pump laser unit adapted for generating an energy signal;
    b) a gain section including a gain medium having a superstructure grating, **said superstructure grating forming a plurality of cavities that are distributed in said gain medium such that different resonant wavelengths resonate in spatially separated portions of said gain medium** when the energy signal is applied to said gain section, the pump laser unit being adapted for applying the energy signal to said gain section such as to cause a multi-wavelength laser signal to be generated; and
    c) an output for emitting the multi-wavelength laser signal.

It is respectfully submitted that MacCormack neither teaches nor suggests the above-emphasized elements of claims 1, 22 and 32. Specifically, MacCormack does not teach or suggest a multi-wavelength laser source comprising a gain section that includes a gain medium having a superstructure grating, where the superstructure grating forms a plurality of cavities that are distributed in the gain medium such that **different resonant wavelengths** resonate in **spatially separated portions** of the gain medium when an energy signal is applied to the gain section.

MacCormack describes an optical source comprising a gain medium provided with gratings that form a plurality of resonant cavities. However, the gratings are distributed and paired in the gain medium such that that different resonant wavelengths resonate in overlapping portions of the gain medium, i.e., they resonate in portions of the gain medium that are **not** spatially separated. This is clearly evidenced, *inter alia*, in MacCormack's Figures 1 to 5, 11

and 12 and their description (e.g., c. 5, l. 31-49) by overlapping portions of the gain medium between pairs of gratings (e.g., 12-12, 14-14, 16-16, 18-18, etc.) that are associated with different resonant wavelengths.

Accordingly, MacCormack does not teach or suggest a multi-wavelength laser source comprising a gain section that includes a gain medium having a superstructure grating, where the superstructure grating forms a plurality of cavities that are distributed in the gain medium such that **different resonant wavelengths** resonate in **spatially separated portions** of the gain medium when an energy signal is applied to the gain section[1].

In light of the above, it is respectfully submitted that MacCormack does not teach or suggest at least one element of claims 1, 22 and 32 and, thus, does not anticipate these claims. The Examiner is therefore respectfully requested to withdraw her rejection of claims 1, 22 and 32, which are believed to be in condition for allowance.

Dependent claims 2, 3, 15, 17-19, 28-31, 33, 34 and 37

[1] For completeness, the Examiner's remarks on page 2 of the Final Office Action regarding homogeneously broadened gain media will be briefly addressed.

Firstly, MacCormack does not contemplate using a *homogeneously broadened* gain medium. Rather, MacCormack only refers to a Raman gain medium (c. 1, l. 57 and 58; c. 5, l. 21 and 22; c. 7, l. 58-61; c. 10, l. 1-3 and 22-23; c. 11, l. 14, 15, 39 and 40). As discussed on pages 9 and 10 of the response to Office Action filed on June 27, 2006, a Raman gain medium is based on stimulated Raman scattering and is thus fundamentally different from a homogeneously broadened gain medium, which is based on excitation of carriers to an upper energy level through absorption of pump energy. A homogeneously broadened gain medium has the (unfortunate) property that it usually emits over only one narrow wavelength band, because of gain competition between laser lines when operated in continuous wave (CW) mode. Thus, notwithstanding MacCormack's failure to contemplate using a homogeneously broadened gain medium, since MacCormack's grating configuration causes gain competition between laser lines (due to different resonant wavelengths resonating in overlapping portions of MacCormack's Raman gain medium), MacCormack's grating configuration would not readily allow lasing of many wavelengths in a homogeneously broadened gain medium.

Secondly, contrary to the Examiner's assertion, the Applicants never contended to have *invented* homogeneously broadened gain media. What the Applicants indicated on page 9, paragraph 4 of the response to Office Action filed on June 27, 2006 is that gain competition between laser lines in a homogeneously broadened gain medium (causing it to usually emit over only one narrow wavelength band) is a problem. In fact, this is clearly echoed by paragraph 2 of the *Photonics Research* article referred to by the Examiner. By virtue of the claimed superstructure grating, the Applicants bring a solution to this problem in embodiments where a homogeneously broadened gain medium is used.

Each of claims 2, 3, 15, 17-19, 28-31, 33, 34 and 37 depends on one of claims 1, 22 and 32 and thus incorporates by reference all of the elements of that base claim. Thus, for the same reasons as those set forth above in respect of claims 1, 22 and 32, the Examiner is respectfully requested to withdrawn her rejection of claims 2, 3, 15, 17-19, 28-31, 33, 34 and 37, which are believed to be in condition for allowance.

2. Rejection of Claims 6-9, 20 and 21 under 35 USC 103

On pages 4 and 5 of the Final Office Action, the Examiner rejected claims 6-9, 20 and 21 under 35 USC 103(a) as being unpatentable over MacCormack in view of U.S. Patent Application Publication 2004/0037505 by Morin (hereinafter referred to as "Morin").

As discussed below, the Applicants respectfully submit that claims 6-9, 20 and 21, as effected by the present amendment, are in condition for allowance and respectfully request the Examiner to withdraw her rejection of these claims.

Specifically, claims 6-9, 20 and 21 depend on claim 1 and thus incorporate by reference all of the elements of claim 1, including those shown above to be absent from MacCormack, namely, a multi-wavelength laser source comprising a gain section that includes a gain medium having a superstructure grating, where the superstructure grating forms a plurality of cavities that are distributed in the gain medium such that **different resonant wavelengths** resonate in **spatially separated portions** of the gain medium when an energy signal is applied to the gain section.

It is respectfully submitted that these elements are also absent from Morin.

Indeed, Morin discloses and claims a certain type of Fiber Bragg Grating Gires-Tournois interferometer for *chromatic dispersion compensation* in a passive optical fiber, i.e., in a fiber without optical gain (parag. 16, 18-21, 37 and 38). That is, Morin's passive optical fiber does **not** form a gain medium and is **not** used for *laser generation*[2].

[2] Notwithstanding that Morin's interferometer is specifically designed for *chromatic dispersion compensation* and is in no way intended to be used for *laser generation*, Morin's interferometer actually renders laser action

Furthermore, while Morin's interferometer can be provided with gratings that define multiple cavities, Morin is totally unconcerned with, and makes absolutely no mention or suggestion of, distributing such cavities in a gain medium (which does not even exist in Morin!) such that **different resonant wavelengths** resonate in **spatially separated portions** of the gain medium.

In light of the above, it is respectfully submitted that at least one element of claims 6-9, 20 and 21 (by virtue of their dependency on claim 1) is neither taught nor suggested by MacCormack and Morin, whether taken separately or in combination. Therefore, the Applicants respectfully submit that at least one criterion required for establishing a *prima facie* case of obviousness in accordance with MPEP 706.02(j)[3] is not satisfied. Accordingly, the Examiner is respectfully requested to withdraw her rejection of claims 6-9, 20 and 21, which are believed to be in condition for allowance.

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impossible. Indeed, Morin's interferometer requires a strong back reflector combined with one or more much weaker input reflectors to achieve its desired dispersion compensation effect (parag. 37, l. 15-30 and parag. 38, l. 16-21). These one or more weaker input reflectors render laser action impossible. Thus, not only is Morin clearly not concerned with laser generation, Morin actually *teaches away* from application of its grating structure for laser generation purposes. As such, combining Morin with any reference (including MacCormack) cannot support a contention of obviousness.

[3] For the Examiner to establish a *prima facie* case of obviousness, three criteria must be considered: (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings, (2) there must be a reasonable expectation of success, and (3) the prior art references must teach or suggest all of the claim limitations. MPEP §§ 706.02(j), 2142 (8th ed.).

CONCLUSION

Claims 1-3, 6-9, 15, 17-22, 28-34 and 37-52 are believed to be in condition for allowance. Favorable reconsideration is requested. In addition, rejoinder of withdrawn claims 4, 5, 10-14, 35 and 36 is respectfully requested upon allowance of the generic claims presently in the application. Early allowance of the present patent application is earnestly solicited.

If the claims of the present patent application are not considered to be in full condition for allowance, for any reason, the Applicants respectfully request the constructive assistance and suggestions of the Examiner in drafting one or more acceptable claims pursuant to MPEP 707.07(j) or in making constructive suggestions pursuant to MPEP 706.03 so that the application can be placed in allowable condition as soon as possible and without the need for further proceedings.

Respectfully submitted,

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